CHAPTER

2

Overview of Water Resources

2.1 INTRODUCTION

Water resources in the Pinal Active Management Area (AMA) include groundwater, surface water, re-usable effluent, and precipitation. Groundwater is located in aquifers, or large underground storage reservoirs, contained by alluvial valleys between mountain ranges. Under natural conditions, groundwater in the AMA is replenished by underflow from other basins and by incidental or natural recharge from water sources located at ground level. Naturally occurring surface waters entering the AMA include intermittent flow in the Gila and Santa Cruz Rivers and imported water from the Colorado River through the Central Arizona Project (CAP). Treated effluent for reuse is available from several industrial sources and municipalities.

In recent years, the rate of groundwater withdrawal in the Pinal AMA has declined significantly from approximately 685,000 acre-feet per year in 1985 to 410,000 acre-feet in 1995. Historic groundwater depletions within the two principal hydrologic subbasins, Maricopa-Stanfield and Eloy, have created two large cones of depression. In localized areas where groundwater withdrawals have exerted the greatest pressure on aquifers, land subsidence has been extensive. During the early 1990s, the rate of recovery exhibited by water levels in many wells in these subbasins tended to accelerate due to natural recharge from flooding of the Gila and Santa Cruz rivers in 1983 and 1993. Another reason for this recovery was the replacing of groundwater as a primary source of supply for irrigation with large volumes of imported CAP water.

2.2 DATA SOURCES

The information presented in this chapter was drawn from state and federal government agencies who are charged with the responsibility of collecting, compiling, and analyzing water resource data in the Pinal AMA. These agencies and their responsibilities are briefly described below.

2.2.1 Arizona Department of Water Resources

The Hydrology Division of the Arizona Department of Water Resources (Department) is charged with the responsibility for monitoring the physical characteristics and production of groundwater wells permitted in the Pinal AMA. Each year, a sampling from 182 water level index wells located on irrigated lands is monitored for change in water level. An additional 40 wells are monitored for water quality parameters, including specific conductance, temperature, pH, fluoride, total dissolved solids, dissolved oxygen, and alkalinity. Many of these index wells date to the 1940s when electrically driven centrifugal pumps were introduced to this region. Once every four to five years, a comprehensive monitoring study is undertaken to investigate approximately 1,200 wells, including the aforementioned index wells. In 1992, the Department published Hydrologic Map Series Report Number 23, a series of maps depicting groundwater conditions based on the comprehensive data collected in 1989 in the Eloy and Maricopa-Stanfield subbasins. Similar monitoring studies were performed in 1993 and 1998.

A regional groundwater flow model was developed for the Pinal AMA by the Department's Hydrology Division in 1990. Relying on the data collected each year from the index wells described above, the Pinal AMA Groundwater Model provides a cumulative source of hydrologic and geologic data for the AMA. The goal of the model is to provide a tool for studying the interrelationships between regional groundwater flow systems, groundwater pumpage, recharge, and the impacts of surface water utilization on groundwater systems. Along with improved understanding of these interrelationships, the model enables the development of useful hydrologic projections for testing and refining groundwater management strategies.

2.2.2 Other Agencies

In June 1996, an assessment devoted to describing current water conditions in the AMAs was published in a report titled, "State of the AMA - Pinal Active Management Area." The purpose of the assessment was to identify water use trends and issues that would influence the development of programs for the Third Management Plan. Much of the baseline information presented in this chapter is predicated on the results of this assessment. Other information used in this assessment included additional studies conducted by the Department, as well as reports published by the Arizona Department of Environmental Quality, the Arizona Geological Survey, the United States Geological Survey, and the recently published environmental impact statement for the Gila River Indian Community.

2.3 GEOLOGIC AND AQUIFER CONDITIONS

The Pinal AMA covers approximately 4,000 square miles in central Arizona. The topography consists of gently sloping alluvial basins separated by north to northwest trending fault-block mountains. Land surface elevations range from 1,000 to 4,000 feet above sea level. The AMA consists of five subbasins with unique groundwater underflow, storage, and surface water characteristics. These subbasins are: Maricopa-Stanfield, Eloy, Vekol Valley, Santa Rosa Valley, and Aguirre Valley. The boundaries of the subbasins follow the highest elevation of topographic divides separating areas from where surface water runoff emanates. The boundaries that separate the Eloy and Maricopa-Stanfield subbasins also signify the presence of groundwater divides that define the extent of groundwater underflow. Migration of groundwater underflow between these subbasins is limited or non-existent. The boundaries of the five subbasins are shown in Figure 2-1.

Groundwater-bearing alluvium in the Maricopa-Stanfield and Eloy subbasins is primarily composed of the unconsolidated sands, gravels, silts, and clays that were deposited by the ancestral Gila and Santa Cruz rivers. In general, these subbasins are stratified into three major aquifer systems: the Upper Alluvial Unit, the Middle Silt and Clay Unit, and the Lower Conglomerate Unit. An extensive perched water table lies beneath the City of Casa Grande. A generalized vertical cross-section diagram depicting current groundwater conditions in these two subbasins is shown in Figure 2-2. Historically, the most intensive pressure on aquifers in the Pinal AMA has been in the Maricopa-Stanfield and Eloy subbasins, where the demand for water by irrigated agriculture has depleted a large portion of the Upper Alluvial Unit and created substantial changes to the direction of groundwater underflow between subbasins. Prior to about 1900, the groundwater system in the AMA was in approximate dynamic equilibrium. Over the long-term, the volume of water entering the system was nearly equal to the volume that migrated from the system, with no change in storage. Although the sediments in most places are heterogenous, the head differences between shallow and deep wells were negligible or non-existent. Over time, however, groundwater withdrawals in excess of recharge have tended to differentially lower water levels in this region, resulting in two large cones of depression. These cones of depression are shown in Figure 2-2 .

2.3.1 Characteristics of Groundwater Underflow

Groundwater underflow enters the Maricopa-Stanfield Subbasin from the Phoenix AMA through Waterman Wash to the west and the Gila River Indian Community to the north. Underflow enters the Eloy Subbasin from the Aguirre Valley Subbasin to the south, from the Tucson AMA south of Picacho Peak, and from the Tucson AMA to the east from Cactus Forest. The total underflow entering the Pinal AMA from known sources outside of the AMA is 50,100 acre-feet.

FIGURE 2-1
CHARACTERISTICS OF GROUNDWATER UNDERFLOW
PINAL ACTIVE MANAGEMENT AREA

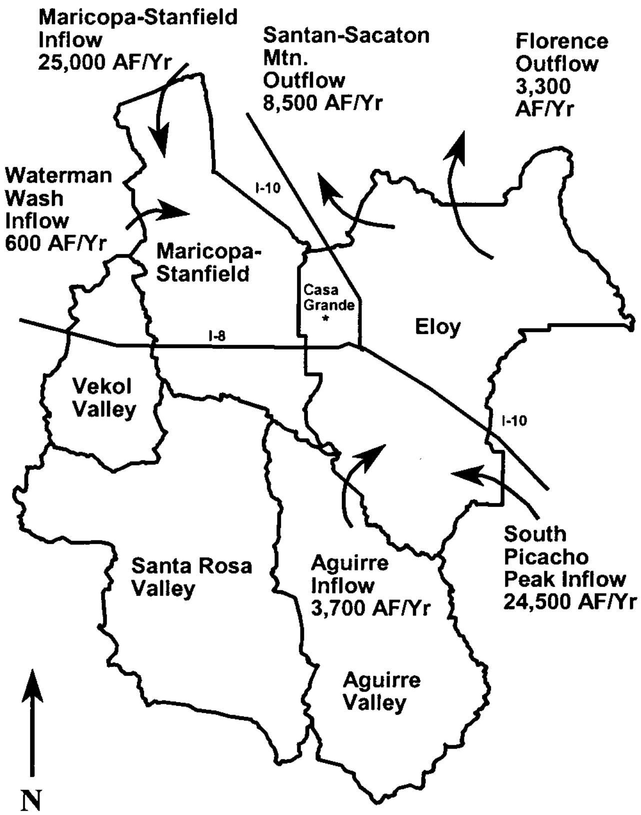
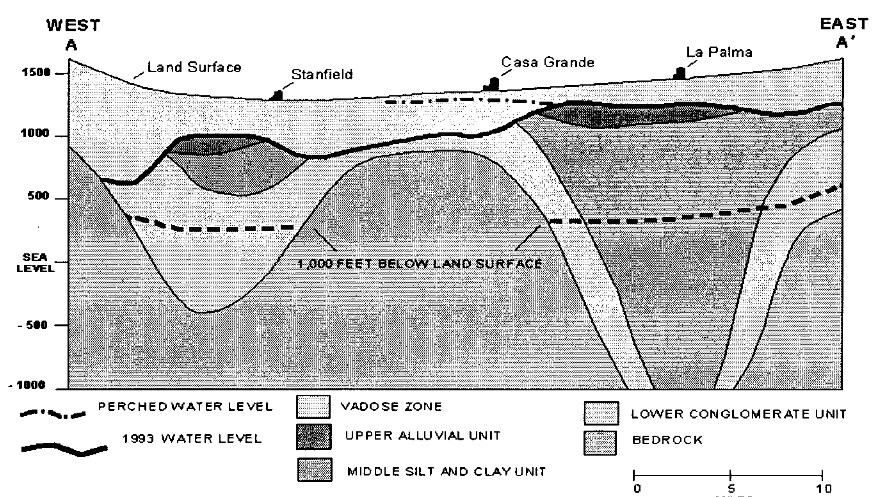


FIGURE 2-2
CONCEPTUAL CROSS-SECTION
ELOY AND MARICOPA-STANFIELD GROUNDWATER SUBBASINS
PINAL ACTIVE MANAGEMENT AREA



Groundwater underflow leaves the Pinal AMA from two locations in the north end of the Eloy Subbasin: north of the Town of Florence and south of Sacaton on the Gila River Indian Community. In both of these locations underflow enters the Phoenix AMA. The total underflow that leaves the Pinal AMA is 11,800 acre-feet. Figure 2-1 graphically depicts the groundwater underflow estimates for the subbasins. The net increase in the volume of water in aquifers from groundwater underflow entering the AMA, less the underflow that leaves the AMA, is approximately 38,300 acre-feet per year.

2.3.2 Natural Recharge

Natural recharge describes water from precipitation runoff that replenishes aquifers by infiltration from land surfaces. Although some runoff from mountain fronts and the basin floor during and following significant precipitation is potentially recharged, the most significant sources of this water in the Pinal AMA are the Gila and Santa Cruz rivers, which import large volumes of runoff from upstream basins outside the AMA during and following heavy rains or mountain snow melt. From 1989 to 1993, the total volume of recharge resulting from flooding of the Gila River is estimated to have been approximately 377,000 acre-feet. The magnitude of flooding of the Gila River, for example, depends on many factors, including the rate of release from the San Carlos Reservoir, the amount and intensity of precipitation, and the infiltration capacity of the river channel. Floods of the magnitude of those in 1983 and 1993 are relatively rare and appear to occur very generally in 10 to 20 year intervals. While the occurrence and intensity of flooding tend to be highly variable, the annualized volume of recharge from floods along the reach of the Gila River within the AMA is estimated to be 10,000 acre-feet per year.

To date, the volume of recharge within the Santa Cruz River channel and on surrounding lands as the result of flooding has not been quantified due to the lack of adequate stream gaging stations. However, the effect on recharge from flooding can be inferred from the rise in water levels in this area following the floods in 1983 and 1993. Potential recharge resulting from effluent and irrigation tailwater discharged into the Santa Cruz River from upstream sources in the Tucson AMA is probably small since all or most of these waters are diverted for irrigation purposes by holders of surface water rights in the area of Red Rock. On average, the annual rate of recharge resulting from flooding along the Santa Cruz River within the Pinal AMA is estimated to be 10,000 acre-feet per year.

2.3.3 Groundwater in Storage

Based on the results of groundwater studies using the Pinal AMA Groundwater Model, groundwater in storage in 1993 in the Maricopa-Stanfield Subbasin to a depth of 1,200 feet was estimated to be 9.6 million acre-feet. Groundwater in storage to a depth of 1,000 feet in the subbasin was estimated to be 8.6 million acre-feet. In the Eloy Subbasin, the volume of groundwater in storage to a depth of 1,200 feet in 1993 was estimated to be about 24 million acre-feet and about 22.5 million acre-feet to a depth of 1,000 feet.

The estimated volume of groundwater in storage in each of the Pinal AMA's five subbasins in 1993 is summarized in Table 2-1.

2.4 SUBBASIN GROUNDWATER CONDITIONS

With the exception of surface water diversions for irrigation from the Gila River, the Pinal AMA has depended on groundwater for irrigation for nearly a century, resulting in declining water levels. During the 1970s, the demand on aquifers in the Eloy and Maricopa-Stanfield subbasins began to diminish due to decreases in cropped acreage after the introduction of federal commodity set-aside programs. Additionally, increasing costs associated with pumping from increasing water depth were a key factor in this acreage decrease. Water levels in some wells began to show signs of recovery during the early 1980s. Beginning in the late 1980s, water levels showed increasing signs of stabilizing as the decline rates in many wells began to decrease and water levels in some wells in the Eloy Subbasin began to rise. The four factors that figure most prominently in this recent trend include: (1) reduction in groundwater withdrawals by irrigated agriculture, (2) recharge of aquifers resulting from floods, (3) effects of aquifer compaction following extensive dewatering, and (4) reduction in planted acreage coupled with increased use of alternative water supplies in place of groundwater.

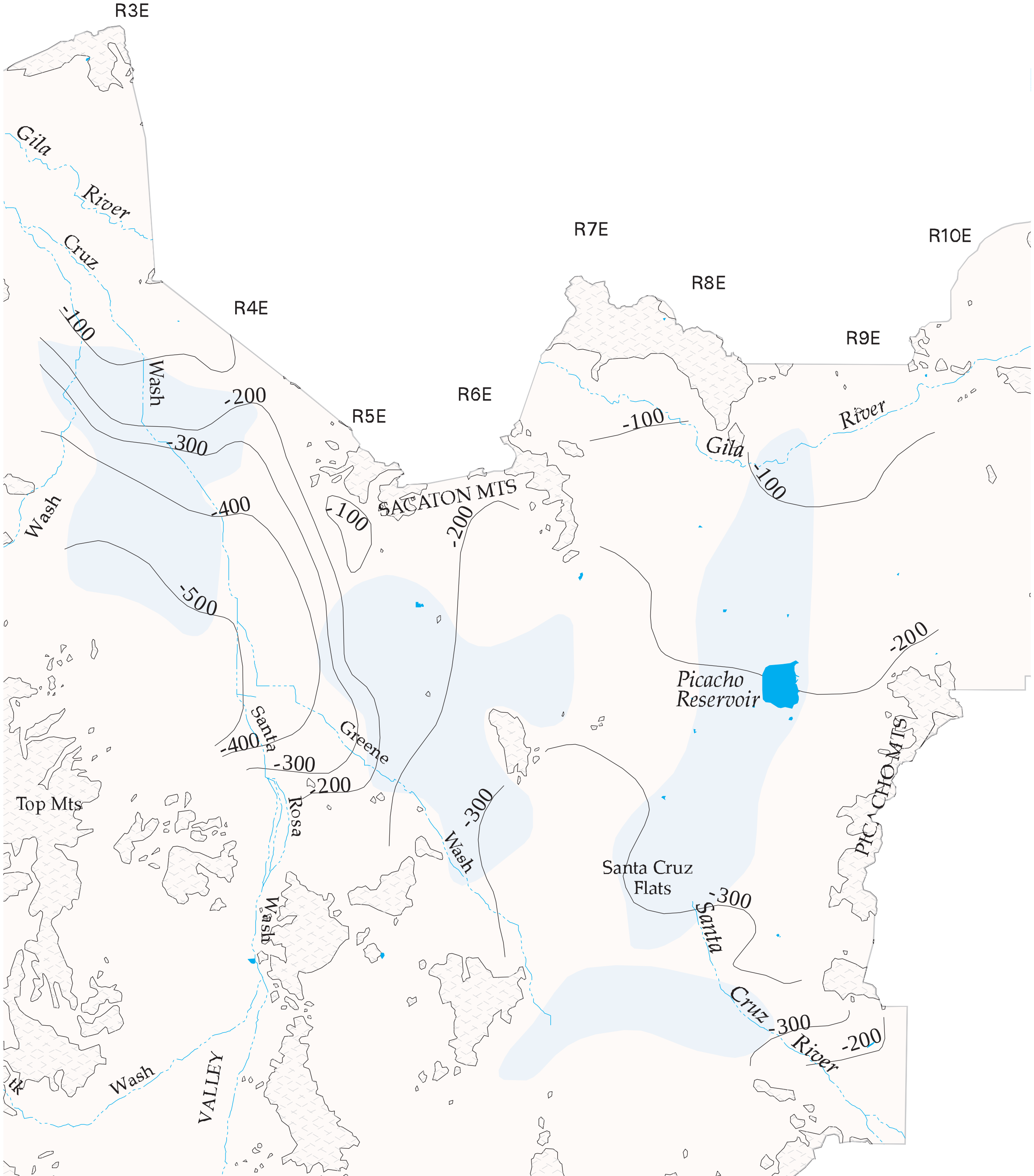
TABLE 2-1
GROUNDWATER IN STORAGE - 1993
PINAL ACTIVE MANAGEMENT AREA
(acre-feet)

	Groundwater In Storage		
Subbasin	**Between Land Surface and 1,200 Feet Below Land Surface**	**Between Land Surface and 1,000 Feet Below Land Surface**	**Between 1,000 and 1,200 Feet Below Land Surface**
Maricopa-Stanfield	10,100,000	8,600,000	1,500,000
Eloy	25,300,000	22,600,000	2,700,000
Santa Rosa Valley	*Unknown*	*Unknown*	*Unknown*
Vekol Valley	4,600,000	4,000,000	600,000
Aguirre Valley	*Unknown*	*Unknown*	*Unknown*
TOTAL	40,000,000	35,200,000	4,800,000

Approximate changes in water levels between the end of the pre-development era in 1900 and 1993 are shown in Figure 2-3. Changes in groundwater levels in the Eloy and Maricopa-Stanfield subbasins between 1977 and 1989 (two years after CAP came on line) are depicted in Figure 2-4 and 2-4A. Changes in water level for the period 1989 through 1993 are shown in Figure 2-5 and 2-5A. During 1993, large amounts of CAP water were delivered to farms in place of groundwater withdrawals, which may have played a key role in the rising or slowing down of water levels over this period. Changes in water level for the period 1994 through 1998 are shown in Figure 2-6. As shown in Figure 2-6, water levels continue to rise in those areas of the Pinal AMA where pumping is most heavily concentrated, including the CAP irrigation districts, most non-district lands, and most parts of the San Carlos Irrigation and Drainage District. In the south-central part of the Maricopa-Stanfield Subbasin, water levels have tended to stabilize. In irrigated areas along the Gila River, water levels have tended to stabilize or rise at slower rates. Depth to groundwater in 1997 in the AMA is shown in Figure 2-7.

2.4.1 Maricopa-Stanfield Subbasin

Following 40 years of intensive agricultural pumpage and declining water levels, water levels in the Maricopa-Stanfield Subbasin began to stabilize in recent years. In some areas, water levels have risen by as much as 100 feet. In general, the depth to groundwater in 1996 across the subbasin ranged from about 150 to more than 600 feet below land surface.



Pinal AMA
Areas Where Perched Grounwater is Known to be Present
Water Elevation Changes in Feet for the Lower Aquifer
Hardrock
Rivers

Figure 2- 3

Water Elevation Change
1900 - 1993 Lower Aquifer

0 1.8 3.5 5.3 7
Miles
North

ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division

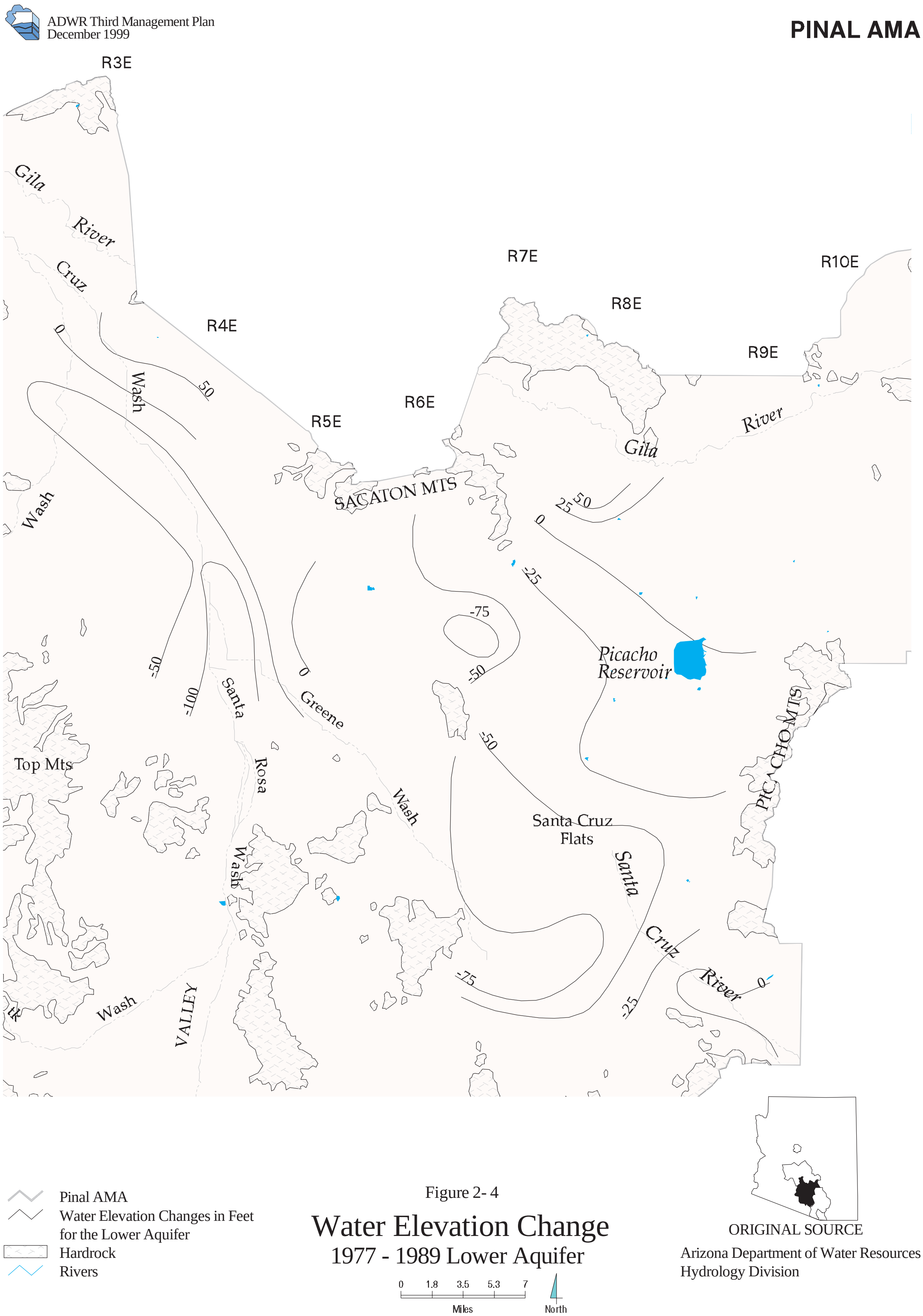


Figure 2- 4

Water Elevation Change
1977 - 1989 Lower Aquifer

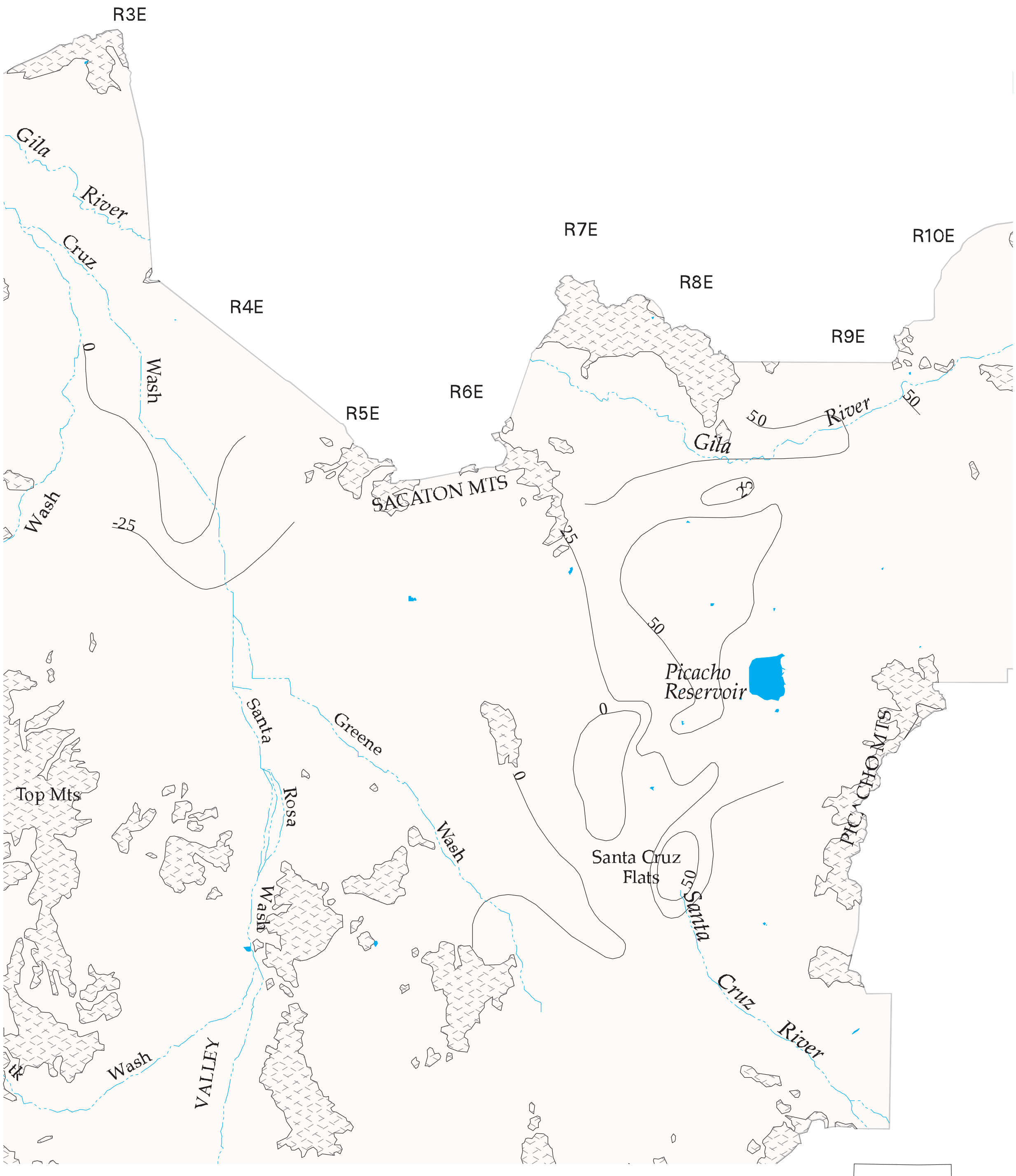


Figure 2- 4a

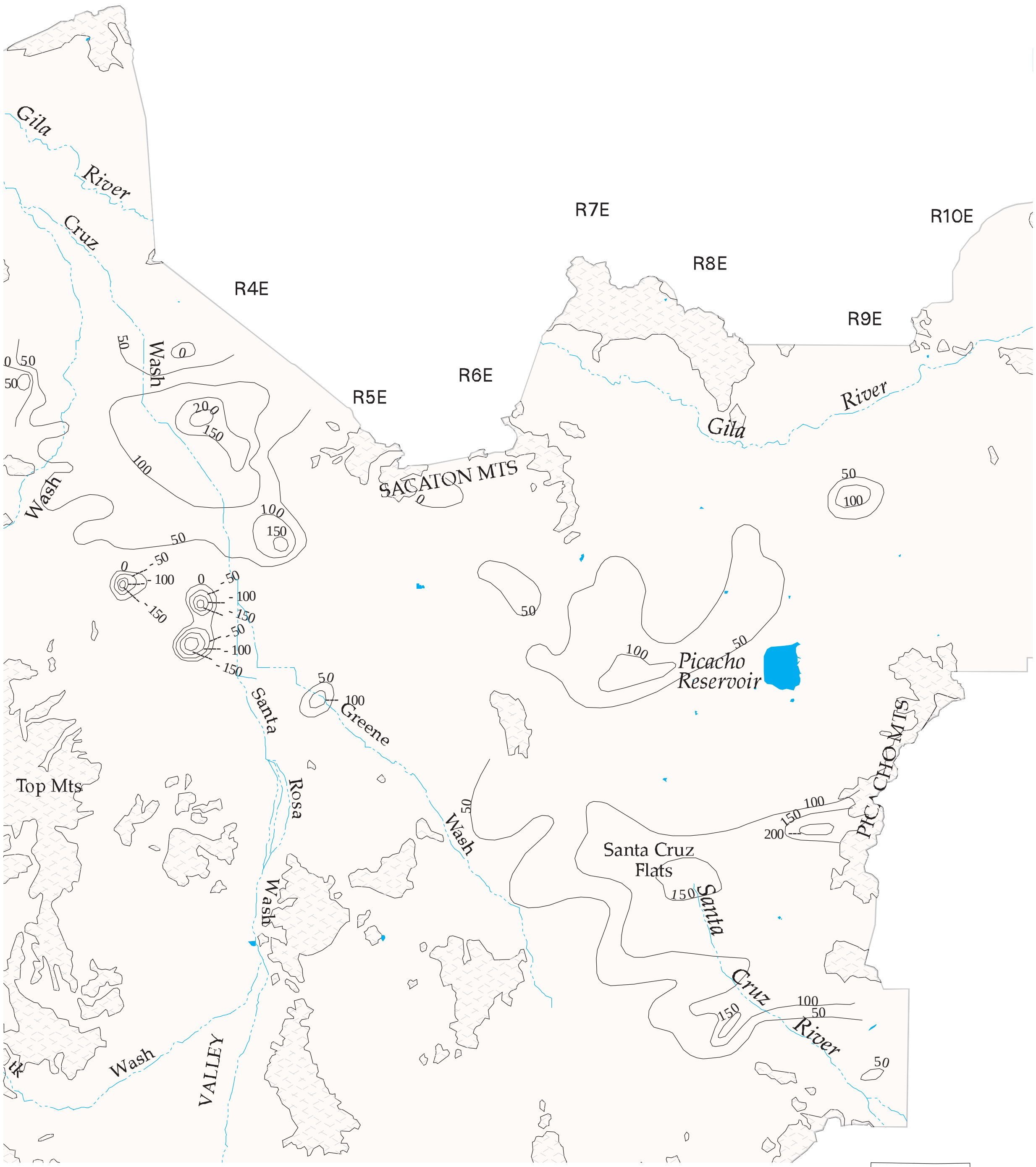
Water Elevation Change

1977 - 1989 Upper Aquifer

Pinal AMA
Water Elevation Changes in Feet for the Upper Aquifer
Hardrock
Rivers

0 1.8 3.5 5.3 7
Miles
North

ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division

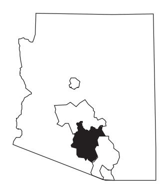


Pinal AMA
Water Elevation Changes in Feet for the Lower Aquifer
Hardrock
Rivers

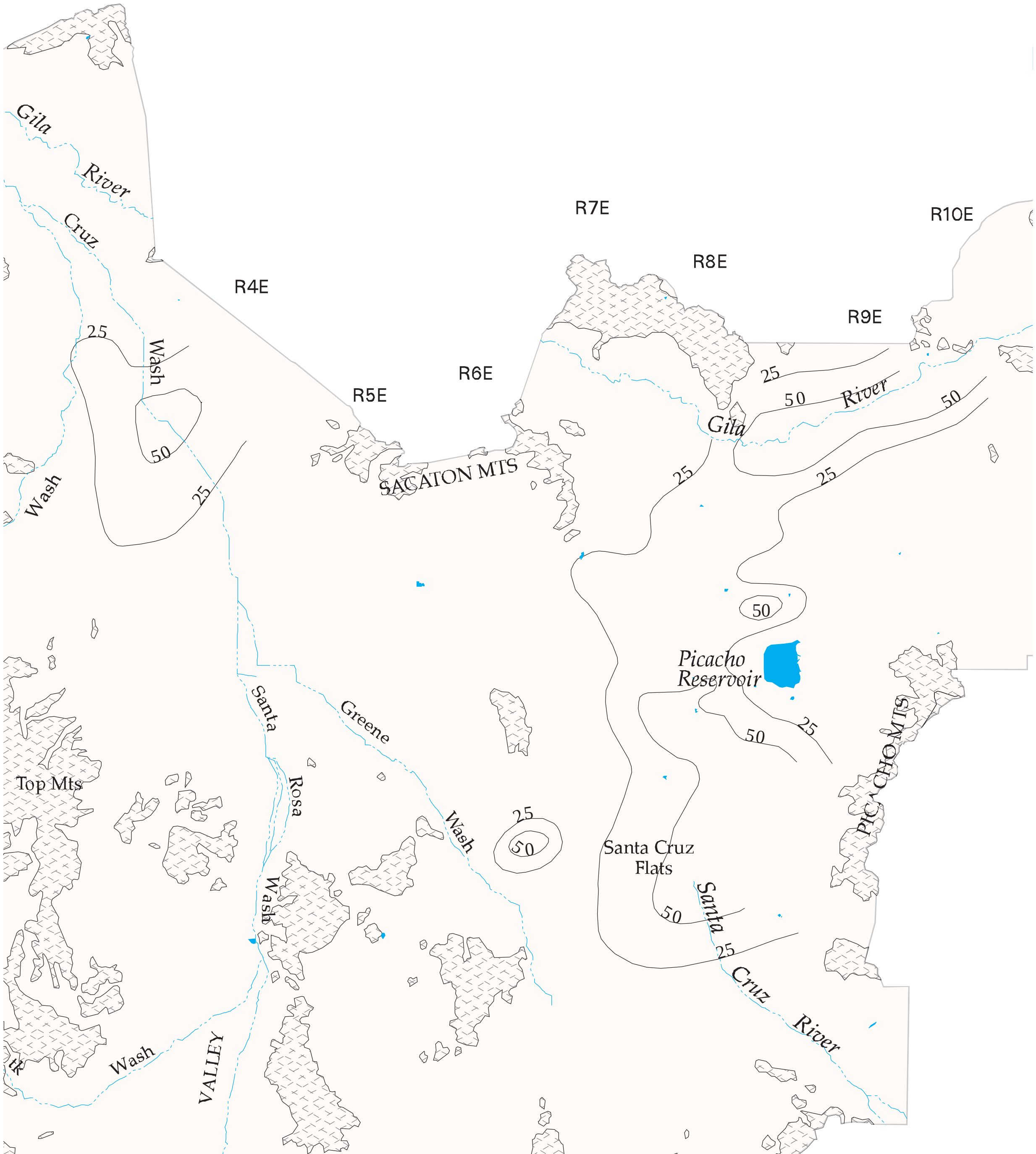
Figure 2- 5

Water Elevation Change
1989 - 1993 Lower Aquifer

0 1.8 3.5 5.3 7
Miles
North



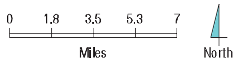
ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division

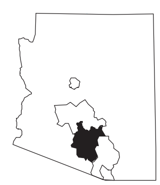


Pinal AMA
Water Elevation Changes in Feet for the Upper Aquifer
Hardrock
Rivers

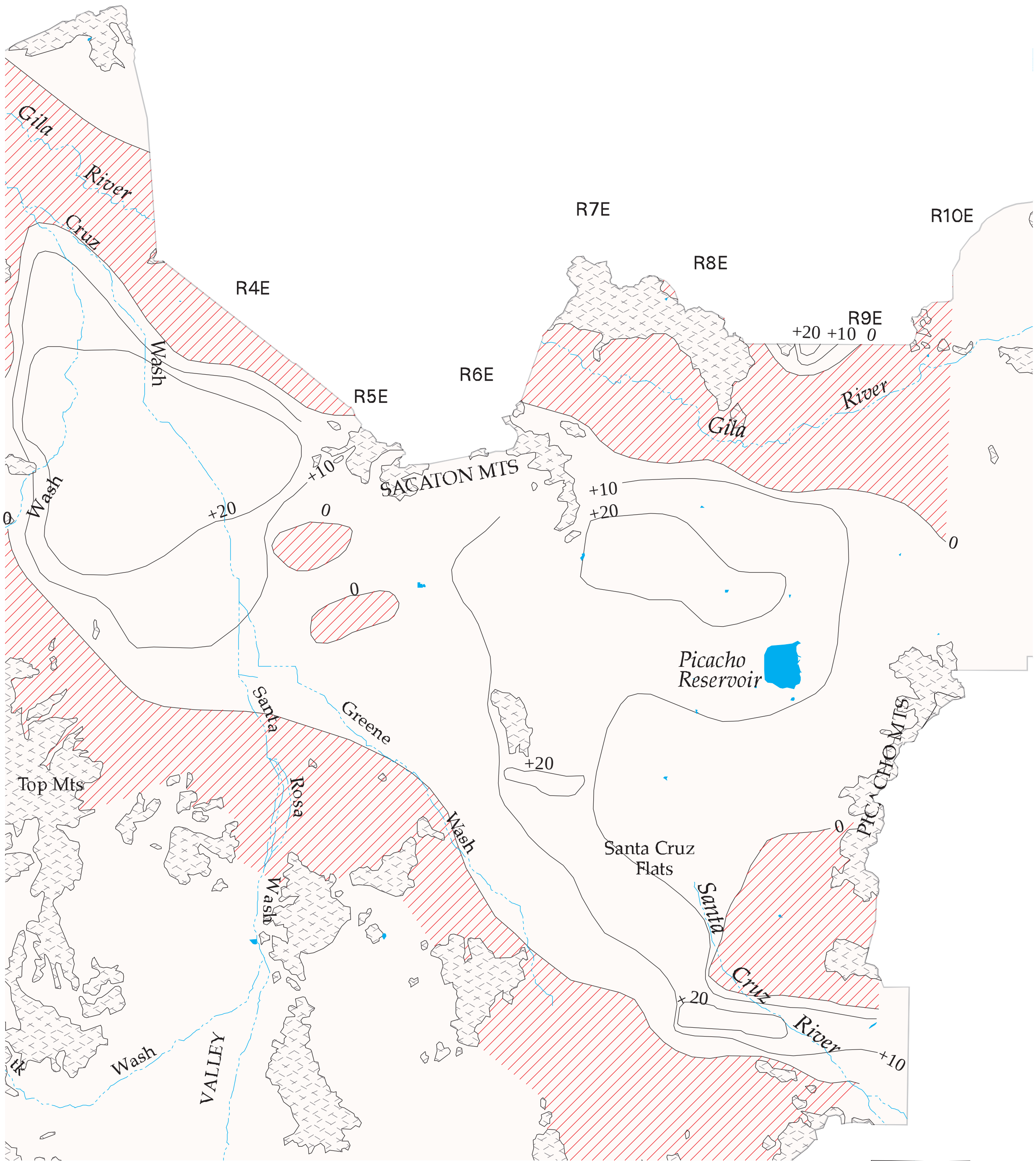
Figure 2- 5a

Water Elevation Change
1989 - 1993 Upper Aquifer





ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division



Pinal AMA
Water Elevation Change in Feet
Area of Water Level Declines
Hardrock
Rivers

Figure 2- 6

Water Elevation Change

1994 - 1998 Composite

0 1.8 3.5 5.3 7
Miles
North

ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division

Figure 2- 7

Depth to Water

ORIGINAL SOURCE
Arizona Department of Water Resources
Hydrology Division

2.4.2 Eloy Subbasin

During the time intervals between significant runoff from floods in the Gila and Santa Cruz river channels over the past 25 years, declining water levels as the result of intense pumping pressure have tended to reverse in the Eloy Subbasin. Reduced groundwater pumping, increased use of CAP water, and Gila River water from nearly full conditions in the San Carlos Reservoir in the mid 1990s also figure prominently in this recent trend of rising water levels. In 1989, rises of as much as 50 to 60 feet were detected in some wells.

In 1993, the depth to groundwater in the Eloy Subbasin ranged from less than 100 feet below land surface in the northern section of the subbasin to about 300 to 400 feet in the south-central section. A unique, perched water table beneath Casa Grande varies in depth from less than 10 feet to about 100 feet below land surface.

In 1996, however, the water levels in clusters of wells located in the extreme north and south-central parts of the Eloy Subbasin began to exhibit signs of decline. The declines in the northern part of the subbasin are attributed to the dissipation of the groundwater mound that formed after the 1993 Gila River flood. In the southern part of the subbasin, these declines are probably due to deep well pumping in that area. Rise and decline of the water levels in these wells suggest a correlation between the intervals of flooding and drought in the areas of close proximity to these rivers.

2.4.3 Other Subbasins

Groundwater resources in the Vekol Valley, Santa Rosa Valley, and Aguirre Valley subbasins are for the most part undeveloped. Little or no information is available on groundwater underflow, water levels, water in storage, and groundwater quality in these subbasins. Generally, groundwater underflow tends to migrate away from these subbasins and enter the Maricopa-Stanfield and Eloy subbasins to the north.

2.5 SURFACE WATER CONDITIONS

2.5.1 Sources of Surface Water in the Pinal AMA

In addition to the CAP, the other major sources of imported surface water to the Pinal AMA are two ephemeral streams that traverse the AMA. These streams are the Gila and Santa Cruz rivers. The confluence of these two rivers is located in the northwestern portion of the AMA. Vekol Wash, Santa Rosa Wash, and Aguirre Wash drain the southern valleys of the AMA and flow northward to join the Santa Cruz River upstream from its confluence with the Gila River. McClellan Wash drains the eastern valleys of the AMA and joins the Santa Cruz River northwest of Picacho. Brady Wash also drains portions of the eastern side of the AMA and discharges into Picacho Reservoir. No perennial streams occur in the AMA with the exception of a slough emanating from the Casa Grande Wastewater Treatment Plant that follows the course of the relict north branch of the Santa Cruz River, which has developed into riparian habitat over time.

Until the late 1800s, the Gila River was a perennial stream. Pre-development flows on the portion of the Gila River that passes through the Pinal AMA are estimated to have been about 500,000 acre-feet per year. The first records of San Carlos Irrigation Project (SCIP) diversions begin in 1930, although initial diversions to non-Indian farmers began much earlier. Annual diversions from the Gila River by SCIP at Ashurst-Hayden Dam have averaged 245,000 acre-feet per year from 1930 to 1995.

Historically, the Santa Cruz River flowed into the Pinal AMA only during significant flood events on the upper Santa Cruz River. Two ephemeral reaches currently exist on the Santa Cruz River within the AMA. The estimated volume of effluent entering the AMA from Tucson, including tailwater runoff from farms in the vicinity of Marana, is about 5,000 acre-feet per year. The estimated flow downstream from the Casa Grande Wastewater Treatment Plant is estimated to be about 800 acre-feet per year.

Streamflow characteristics for significant ephemeral streams and washes in the Pinal AMA are summarized in Table 2-2. Due to terrain problems and changes in the meandering course of the Santa Cruz River where it enters the AMA at Red Rock, the installation of a permanent gaging station to measure streamflow into the AMA has not been feasible. Statistics shown in this table for the Gila and Santa Cruz rivers are based on records of measurements taken at gaging stations located near the confluence of these rivers at Laveen, Arizona. In 1994, a new gaging station was placed in the Gila River southeast of Sacaton, near the location where the river leaves the AMA. Data from this new station is pending official publication.

2.5.2 Surface Water Impoundments and Other Structures

Six surface water structures have been constructed in the Pinal AMA: Ashurst-Hayden Diversion Dam, Picacho Reservoir, Link Reservoir, Tat Momolikot Dam, and two reservoirs recently constructed by the Hohokam Irrigation and Drainage District for regulating the flow of CAP water. Ashurst-Hayden Diversion Dam and Picacho Reservoir are components of SCIP. Picacho Reservoir was designed to regulate canal flow and has a storage capacity of 24,500 acre-feet. Link Reservoir, with a storage capacity of 60 acre-feet, is the terminal reservoir for the CAP in the Maricopa-Stanfield Subbasin area. Tat Momolikot Dam, designed to control flooding on the Santa Rosa Wash, has a reservoir storage capacity of 373,000 acre-feet. However, the reservoir, Lake St. Clair, is normally dry. The Hohokam East Regulating Reservoir is designed to store approximately 170 acre-feet of CAP water and the Hohokam West Regulating Reservoir, about 120 acre-feet.

TABLE 2-2
STREAMFLOW CHARACTERISTICS
PINAL ACTIVE MANAGEMENT AREA
(acre-feet)

Station Name	Period of Record	Mean Annual Flow	Record Annual High Flow	Record Annual Low Flow
Gila River near Laveen	1941-1994	26,730	416,005	0
	1941-1946	15,400	123,050	340
Santa Rosa Wash near Vaiva Vo	1955-1983	940	189,067	7

Source: U.S. Geological Survey, 1994, National Water Information System.

2.5.3 Surface Water Uses

Surface water in the Pinal AMA is used exclusively for agricultural irrigation and turf watering purposes. At present, all surface water supplies imported into the AMA through the CAP or diverted from either the Gila or Santa Cruz rivers are utilized within the Maricopa-Stanfield and Eloy subbasins. It is doubtful that the areas that are served by these supplies will include other subbasins because of problems relating to distance and higher elevation. However, the Tohono O'odham Nation is considering lifting CAP water with pumps to serve areas within the Santa Rosa Valley Subbasin where developed cropland is currently irrigated or expansion is contemplated.

2.6 SUBSIDENCE

In areas of intensive groundwater development, the land surface may subside, resulting in substantial economic consequences. Land subsidence and the resulting earth fissures can cause considerable damage to farmland, irrigation canals, sewage systems, well casings, and building foundations. Erosion along fissures may reverse drainage patterns and remove land from irrigation. Compaction and reduced pore space of alluvial sands and gravels following subsidence may tend to decrease the water storage potential of aquifers. In the Pinal AMA, land subsidence and earth fissuring have been recognized as problems for many years. In some areas, subsidence has been substantial. The results of an aerial survey of irrigated cropland in these subbasins in 1994 suggest that fissuring may be more widespread than was previously shown in earlier studies.

Subsidence and earth fissuring are a direct result of groundwater depletion and water level declines, which, in turn, induce compaction of fine-grained sediments in the deep groundwater basins. Benchmark releveling has indicated land subsidence is occurring throughout the Maricopa-Stanfield and Eloy subbasins. Near Stanfield, land subsidence was measured at 11.8 feet by 1977. Earth fissures in the Maricopa-Stanfield Subbasin are common at basin edges and near the periphery of subsidence areas.

Groundwater depletion has also caused land subsidence and earth fissures in the Eloy Subbasin. More than 15 feet of land subsidence was measured as of 1985 south of Eloy. Earth fissures were first reported in 1927, near the eastern edge of the Eloy Subbasin adjacent to the Picacho Mountains. Today the earth fissure system near the Picacho Mountains extends along a north-south line for approximately nine miles.

Evidence of fissuring has also been detected in the Vekol Valley, Santa Rosa Valley, and Aguirre Valley subbasins. Figure 2-8 shows the location of the known earth fissure zones in the Pinal AMA.

Subsidence problems in the Pinal AMA are expected to continue according to recent studies by the United States Geological Survey, probably for centuries after declines have ceased. In addition to potential impacts on the structural integrity of buildings, improved highways, and roads, subsidence is suspected of causing significant changes in flood runoff patterns, particularly along the upper Santa Cruz River. The Department and other governmental agencies will continue to monitor and evaluate subsidence during the third management period.

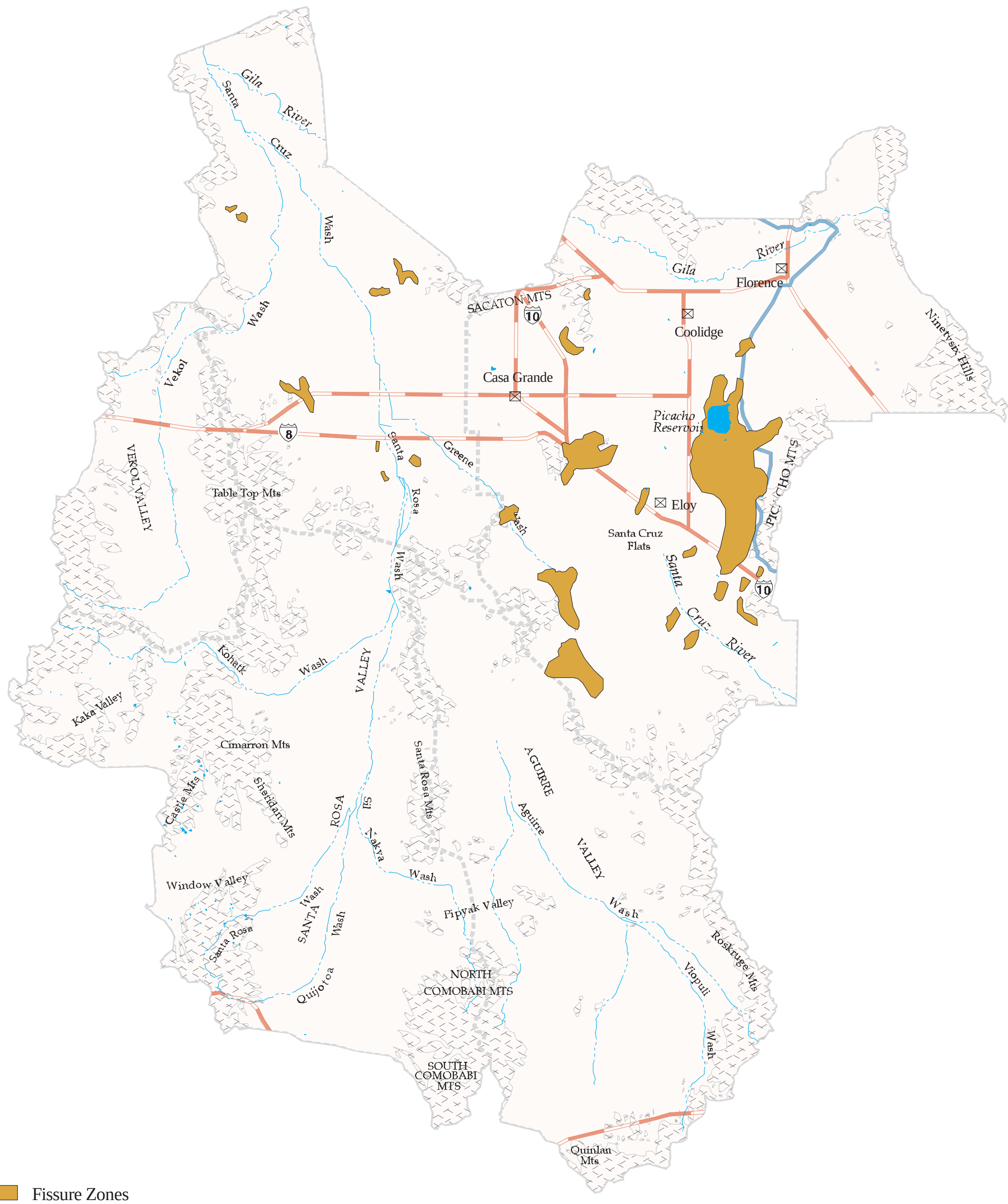
2.7 WATER QUALITY LIMITATIONS ON SUPPLY

With respect to patterns of water use as they currently exist, the quality of most Pinal AMA groundwater and surface water supplies tends to be within the acceptable range of both state and federal standards. While water quality in the AMA is more fully described in Chapter 7, this section summarizes water quality effects on supply where the use of certain water supplies are restricted by chemistry or contamination.

2.7.1 Groundwater Quality

In several locations within the Pinal AMA, groundwater for potable purposes is limited by excessive levels of nitrates. Groundwater usage in one remote area is restricted by the presence of radiochemicals. The most economical alternative of mitigating these effects is to dilute the groundwater with non-contaminated water supplies or by well abandonment and replacement.

Currently, groundwater quality is not a limiting factor for irrigated agriculture in the Pinal AMA. In those locations where the salinity of groundwater exceeds 1,000 parts per million (ppm) of total dissolved solids (TDS), the effects of these levels on soils and crop production are mitigated by leaching and crop rotation.



Fissure Zones
Hardrock
Pinal AMA
Rivers and Streams
Highways and Roads
Subbasins
CAP Canal
Cities

Figure 2- 8

Earth Fissure Zones

ORIGINAL SOURCE
US Geological Survey

0 3 6 9 12
Miles
North

2.7.2 Surface Water Quality

At present, all surface water supplies in the Pinal AMA are used exclusively for irrigation and turf watering. The salt content of most surface water in the AMA tends to fall below 1,000 ppm of TDS and, in most cases, does not require extra water for leaching purposes. The average salt content of Gila River water at Ashurst-Hayden Dam is approximately 550 ppm.

Since CAP water was introduced to the Pinal AMA during the late 1980s, the salt content of this water remained fairly constant each year between 520 and 690 ppm. Salt content of CAP water at the Coolidge Mile Post of the Fanning-McFarland Aqueduct has tended to vary between winter and summer by approximately 100 ppm due to changes in the water level of the Colorado River and other upstream factors. The quality of Santa Cruz River water is undetermined due to the variability of flow from effluent sources and irrigation return flows. The representative quality of surface water in the AMA is summarized in Appendix 7E.

2.8 SUMMARY AND CONCLUSIONS

At the present time, the quality and quantity of available water resources in the Pinal AMA are sufficient in order to meet existing agricultural, municipal, and industrial needs. In the Maricopa-Stanfield and Eloy subbasins, the estimated volume of groundwater in storage to 1,000 feet below land surface that is available for achieving the AMA's water management goal is 31,200,000 acre-feet. Since 1985, groundwater levels have recovered in many wells due to several factors, including natural recharge from flood events in 1983 and 1993, reduced groundwater withdrawals by irrigated agriculture, and increased importation and use of CAP water. Recent data suggest that water levels are recovering throughout the region, while in some areas, water levels are beginning to stabilize or decline. This effect is most apparent in parts of the Eloy Subbasin, near or within the outreach of the Gila and Santa Cruz rivers where significant flooding has not occurred since 1993.

It is important to note that without the continued availability of replacement supplies from the CAP, groundwater withdrawals will increase, likely resulting in accelerated and widespread rates of groundwater level decline.